

Claims

1. A process for the synthesis of methanol comprising passing a preheated synthesis gas comprising hydrogen and carbon oxides at an elevated pressure through at least one uncooled fixed bed of a methanol synthesis catalyst whereby methanol synthesis is effected adiabatically, cooling the resultant partially reacted synthesis gas by heat exchange with a coolant after passage through each bed, passing the resultant cooled partially reacted synthesis gas through a fixed bed of a methanol synthesis catalyst disposed in a heat exchange reactor having tubes disposed therein through which a coolant is passed in a direction that is co-current with the flow of the partially reacted synthesis gas through the catalyst bed of said heat exchange reactor whereby further methanol synthesis is effected and the coolant is heated, cooling the resultant reacted synthesis gas to below the dew point of the methanol therein and separating methanol leaving a stream of unreacted gas, passing part of said unreacted gas, together with make-up gas comprising hydrogen and carbon oxides, through said tubes as the coolant of said heat exchange reactor thereby producing the preheated synthesis gas to be fed to said at least one uncooled fixed bed of methanol synthesis catalyst.
2. A process according to claim 1 wherein, prior to passage through the fixed bed of methanol synthesis catalyst cooled by coolant passing through tubes disposed in the heat exchange reactor, the cooled partially reacted synthesis gas is passed through an uncooled fixed bed of a methanol synthesis catalyst whereby methanol synthesis is effected adiabatically, without subsequent cooling of the resultant synthesis gas.
3. A process according to claim 1 or claim 2 wherein the pre-heated methanol synthesis gas is subjected to two stages of adiabatic methanol synthesis with cooling of the partially reacted synthesis gas after each stage.
4. A process according to any one of claims 1 to 3 wherein the temperature at which the synthesis gas enters the second and any succeeding beds is at least 5°C greater than the temperature at which it entered the preceding bed.
5. A process according to any one of claims 1 to 4 wherein the coolant used to cool the partially reacted synthesis gas after the, or each, stage of adiabatic methanol synthesis is water under sufficient pressure to prevent boiling.
6. A process according to claim 5 wherein the make-up gas is produced by a process including a step of steam reforming wherein a mixture of steam and a hydrocarbon

feedstock is contacted with a steam reforming catalyst at an elevated pressure, and temperature, and said mixture of steam and hydrocarbon feedstock is produced by contacting the hydrocarbon feedstock with the heated water formed as a result of the use of water as the coolant.